

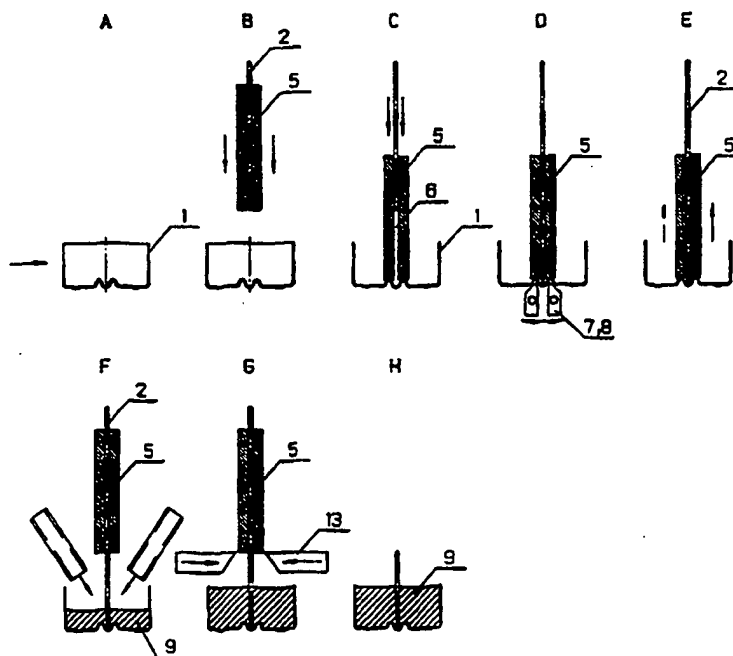
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: A CANDLE CONTAINER, A METHOD OF MANUFACTURING A CANDLE CONTAINER, A METHOD OF ATTACHING A WICK TO A CANDLE CONTAINER AND A METHOD OF MANUFACTURING A CANDLE COMPRISING A CONTAINER FILLED WITH FUEL

(57) Abstract

The invention relates to a candle container, a method of manufacturing a candle container, a method of attaching a wick to a candle container and a method of manufacturing a candle comprising a container filled with fuel (9). The invention comprises forming a container (1) from a blank in which at least two folds have been made. The wick (2) is attached to the container by clamping it between protrusions in the bottom of the container formed by the folds.



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A CANDLE CONTAINER, A METHOD OF MANUFACTURING A CANDLE CONTAINER, A METHOD OF ATTACHING A WICK TO A CANDLE CONTAINER AND A METHOD OF MANUFACTURING A CANDLE COMPRISING A CONTAINER FILLED WITH FUEL

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The invention relates to a new method of manufacturing a container candle and a new method of attaching the wick to the candle container and a container produced therefor.

10 A traditional container candle, e.g. an outdoor flare or a smaller tea light for indoor use, comprises an unburnable container or outer shell, e.g. aluminium, plastic, the candle material, e.g. paraffin, stearin or other burnable material, of the wick, e.g. waxed cotton thread, impregnated cellulose
15 sheet, and of the wick attaching plate. Instead of using a attaching plate, the wick can be attached by gluing. The disadvantage of attaching the wick by a plate is i.a. that candle material remains unburned in the bottom of the container, because the plate prevents the melted candle material
20 al from absorbing into the wick. The disadvantage of attaching by glue is i.a. that, when there is very little candle material, the temperature of the candle rises easily so high that the glue melts and the wick falls causing either the candle to go out or in the opposite case a so called flame
25 up, which can sometimes be very strong. A plate for attaching a wick provides partly the same problem, as the plate is generally not in any way attached to the candle container. Generally, the separate parts of a container candle are manufactured by different machines and often also in different
30 plants. The actual candle manufacturer makes only the candle itself and the assembly of the different parts.

Such a solution has also been presented, in which projections are formed in the bottom of the candle vessel at distance from each other, providing a groovelike space between
35 them, in which the wick can be placed. The attaching is made by pressing the projections against each other when the wick has been placed in the groove. However, in this solution the

projections make the thickness of the vessel material considerably thinner already in the manufacturing stage, and further so when the wick is attached between the bulges. As a result of this the material thickness and the strength of the vessel is poorest in the spot where most needed, increasing also the risk of raw material cracking when attaching the wick.

Such a manufacturing method can be realized by e.g. deep-drawing, by which the bellies are made simultaneously with the forming of the cup.

A further disadvantage of the above mentioned cups or vessels and manufacturing method is, that the different parts of the ready-made product, especially the candle and the vessel, are very easily separated from each other. This manufacturing method requires also a fairly thick and high-quality vessel material, which increases the material and manufacturing costs of the product.

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The method and product according to the invention provide considerably improvements of the above mentioned disadvantages. The method and the product are characterized in what is presented in the claims.

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Significant advantages of the invention are i.a. that in the subject method all parts of the container candle can be manufactured by one machine at the same site. The candle manufacturer has not to buy the cups, but can make the cup from a plate by shaping. The invention is most suitable for candles of different size. The container can be made of considerably thinner material than traditionally. The candle stays well in the vessel. The method enables total burning of the candle material, as the melted candle material is freely absorbed into the wick. The flame-up risk has been reduced compared to traditional wick attaching methods, as the wick is attached directly to the candle container. By this, the wick cannot fall nor rise to float on the surface of the

melted candle material. The attaching point of the wick in the bottom of the cup is stronger than the other parts of the vessel, as the raw material thickness in this spot is at least double. No stretching of the cup raw material takes place when attaching the wick, which makes the appearing of holes most unlikely. The manufacturing method according to the invention does not require expensive deep-drawing devices, neither as high raw material standards for the cup as the deep-drawing method. This results in considerably lower manufacturing costs of the cup than with previously known methods, as qualitatively off-grade raw materials can be used. A very thin material can be used. As a result of this, the recycling of the cup raw material is considerably easier than previously, because after the burning of the candle the remaining parts are all of the same material, and due to the thinness of the material very easy to fold and store in small spaces. The appearance can easily be modified.

The invention is below described with reference to the enclosed drawing.

Fig. 1 presents the manufacturing stages of a powder-moulded container candle.

Fig. 2 presents one form of embodiment of the manufacturing method according to the invention.

Fig. 3 presents one form of embodiment of the manufacturing stages of a dipped container candle.

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Fig. 4 presents one form of embodiment of the manufacturing stages of a powder-moulded container candle.

Fig. 5 presents one form of embodiment of the manufacturing stages of a container candle powder-moulded straight into the container.

Figs. 6a, b and c present one form of embodiment of the attaching members of the wick.

Fig. 1 presents the stages of the traditional, i.e. the prior art manufacturing method of a container candle. The wick 2 is attached to the attaching plate 15 by introducing the wick 2 into the hole 16 of the attaching plate. The plate is pressed to attach the wick, and the wick is cut into suitable length, as shown in sections A and B of Fig. 1. The arrows show the movement directions of the different means. In stage C, the wick 2 attached to the plate is introduced through the hole 12 in the moulded candle, and the so made candle is placed in the container 1 formed as a cup in the stages D and E.

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Fig. 2 presents an embodiment of the container candle manufacturing method according to the invention and the periodically, intermittent rotating drum used in this method. In this example, four moulds are attached to the drum 21 at intervals of 90 degrees in the periphery of the drum. Against the lower container mould 20 is provided the upward/downward moving shaping piston 22. The bending naturally requires prior art power-sources for the cutting, attaching and reeling out of the container (shell) plate, which sources are not presented in fig. 2. The container plate, i.e. the foil 24, is decoiled from the roll 23. The plate is bent consecutively transverse in relation to the discharge direction into two waves, that stay in upright position, providing between them a space for the wick. The waves are pressed at a certain length against the plate by e.g. rollers placed at distance apart, so that in the center of the cup to be formed, the waves remain in upright position for the wick. To prevent bending in the center, a support can be placed in a desired spot to keep the waves in upright position, in which spot the wick can be placed later on.

A circular piece is cut from the plate. The piece is bent or shaped against the arbor of the drum to form a vessel. The

walls of the vessel become crimped, as excess plate material remains in the walls. The wick is placed in the center and attached to the center of the bottom by pressing. The wick is pressed from both sides by a double plate material layer, 5 which considerably increases the strength of the spot subjected to pressure.

After this follows e.g. the other candle manufacturing stages as presented below. When using a drum according to the 10 invention, the container can be kept in the mould 20 by vacuum. When the blank has been formed into cup shape, the drum 21 is rotated 90 degrees at a time periodically 270 degrees around the drum, in which position the ready candle is removed from the mould. When the drum has further turned to 15 its original position, a new cup is shaped in the mould, and then subjected to the above mentioned measures. When there are four moulds, a new container is formed in the mould 20 at the bottom level of the drum 21 after each turn of 90 degrees. When the mould 20, containing the container, has 20 proceeded to the upper part of the drum 21, the wick is attached and the candle is made either by dipping or moulding. The ready product is removed from the mould 20, when the drum 21 after the manufacture of the candle has turned 90 degrees. When the device is in production, all 25 three above mentioned operations can favorably be performed simultaneously, i.e. the shaping of the container in one cup, the attaching of the wick/candle manufacture in a second cup and the removing of the ready product to the next cup. Several moulds 20 can be handled parallel in the longitudinal 30 direction of the drum 21, by which there can be an amount of container shaping pistons 22, wick attaching-/candle manufacturing devices and discharge devices for the ready product corresponding to the amount of moulds 20. In case the amount of these devices is less, they have to be 35 movable in the longitudinal direction of the drum 21.

More in detail, the decoiling of the foil in the solution according to fig. 2 is made by using e.g. three rolls 26,

27, 28. In the first set of rolls 26 there are two opposite rolls, the one having grooves 30 and the other pivots 31 in the corresponding spots. The next rolls 27, through which the foil containing the waves or the folds 25 are run, press 5 the produced waves on a certain area against the foil, so that in the center of the bottom of the cup to be, the folds remain in an upright position. The third set of rolls 28, provided after the cutter 221 and the arbor equipment 22, steers the remaining of the plate to a roll or e.g. into a 10 collecting vessel.

After the second set of rolls 27, the foil 24 is bent into the shape of a cup. A shaping arbor 22 is first placed in the spot of the cup bottom to be. The arbor is surrounded by 15 shearing (cutting) tools 221. When the blank is in its place, it is attached by the clamp 222 on the outer edge of the shearing tool 221 against the cushion part 223 of the cutter. The blank is cut loose by pushing the shearing tool 221 through the blank. The shearing tool is returned to its 20 former position and the blank is pushed by the arbor 22 against the mould 20. The arbor 22 is returned and the next cup is subjected to the same procedure.

The cup is bent and fed step-wise so that the drawing device 25 28 is first closed and the feeding device 26 is open. The feeding device 26 is moved backwards and pressed to the foil in a predetermined spot. After that, the feeding and drawing devices are moved in closed position forwards and the blank is cut, and when the blank is in the desired spot, the cup 30 is bent. Waste can be reduced by lateral movement.

Fig. 3 presents a candle manufacturing and wick attaching method according to the invention, making the candle by casting. First the container is shaped into a cup as presented in the figure. The wick 2 is brought to the cup 1 along 35 an elongated wick guide 5 (stages B and C), having a hole 6 for the wick 2, the guide 5 is steered in between the waves in the bottom of the cup, the wick is fed to the cross

groove 3 along the hole 6. The wick 2 is pressed by interior or exterior clips 7, 8 from the inside of the cup (stage D), the guide 5 is retracted (stage E) and the candle compound 9 is fed to the cup 1 (stage F), whereafter the wick 2 is cut 5 (stage G). Alternatively, as e.g. in the fig. 2 solution, the wick can favorably be attached from the inside of the cup by the wick guide means 5 provided at its end with a groove for receiving the folds 25, by twisting the guide means 5, causing the folds 25 to press the wick 2 to the 10 bottom by turning the folds on the different sides of the wick in different directions.

Fig. 4 presents the separate stages of making a powder-pressed candle 9. The cup 1 is made as presented in fig. 2, 15 and the candle is made in advance. A hole is left in the candle for the wick. The wick guide 2 is moved to the upper surface of the candle (stages C and D) so that the guide hole 6 and the hole 12 for the wick are opposite each other. The wick 2 is fed to the bottom of the cup (stages D and E), 20 having in its belly a groove 3 for the wick between the waves. When the wick 2 is sufficiently deep, the waves surrounding the wick 2 are pressed together (stage E). The wick guide 5 is pulled up and the wick is cut by blades 13 (stages F and G). The candle material is placed in the cup 1 25 (stages A and B). The picture 4 H shows the ready product.

Fig. 5 presents the manufacturing and wick attaching stages of a powder-pressed candle straight into the container. The cup 1 has been made in the previous stage in the mould 20 30 (stage A). The wick and powder guides 5, 10 are led into the cup 1 (stage B). The wick guide 5 is fed to the bottom of the cup, and the wick is led to the spot between the waves (stages C and D). The wick 2 is attached to the bottom by pressing with the clips 7, 8 from the inside or outside 35 forcing the waves against each other. The wick guide 5 is pulled to the upper surface of the candle to be (stages E and F), and a sufficient amount of powder is fed into the cup (stages C and D), and further simultaneously the press

piston 11 is lowered (stages E and F). By this, the upper surface of the candle material 9 is packed to the upper level of the cup. In the next stage, the wick and the powder guides 5, 10 and the press piston 11 are lifted into normal position (stages F and G) and the wick 2 is cut (stage G). In the pictures 5 H and I the candle is removed from the mould 20.

The containers can be of different shapes depending on the bending or the shaping tools. With container shapes as presented above, also cone surfaces of the wick guide can be used for the attaching of the wick. When the guide piston has been lowered, the crest of the waves or the walls on both sides of the groove are made to turn so that they press the wick in the groove.

Fig. 6a presents a picture of a cup made by bending and equipped with attaching means according to the invention. Folds 25 have been bent at the full length of the cup bottom, and the wick can be attached between these folds by placing the wick in-between and bending the folds against the wick. The folds are bent against the surface of the cup closer to the cup edges prior to the actual candle making process, and in the middle they are bent in the wick attaching stage or already prior to bending the cup. Figs. 6b and c present intersections of the directions A-A and B-B shown in fig. 6a. In this case e.g., means for the attaching of the wick are bent in the center of the bottom of the plate, whereafter a cup of desired shape is cut, which is bent into the shape of a cup by using arbors, which take into consideration the bent spot. The bending provides the crimped cup edges.

The cup is thus of the same piece as the attaching means. The cup material can be mechanically shaped as presented above.

The manufacturing method of a container candle can e.g. be realized by incorporating several moulds into the shaping means. The blanks are shaped against the moulds, whereafter the candle manufacture can be realized as presented in figs. 3-5. The attaching of the wick can also be realized so that the candle material pressure itself, generated in the manufacturing, forces the waves against the wick.

The shaping arbor 22 can be rotated during the bending in one direction, providing a homogenous crimping of the edges.

When previously the cup thickness has been 0,15-0,2 mm, a considerable saving is achieved as thinner plate material can be used, e.g. 0,1-0,01 mm especially 0,03-0,06 and more favorably approx. 0,05 mm.

Fig. 2 presents moreover alternative drawing and bending means, which can be used instead of the rolls 26 and 28, as e.g. plates placed opposite to each other, with the plate to be shaped in-between, and which move up and down and forwards and backwards, as shown by the arrow. The plates have corresponding projections and recessions.

Please note that the invention has above been presented with reference to only one of its favorable embodiments. The invention is not to be considered as so limited, but several modifications within the scope of the inventive idea defined by the claims are possible. The fold can e.g. be a crease or a corresponding part produced by bending, having substantially the same length as the plate or the blank, projecting outside the plate level, and comprising at least two portions to be pressed against each other.

CLAIMS

1. A method of manufacturing a container candle, in which method a wick (2) is attached to the cup, the cup is filled
5 with candle material, characterized in that at least two parallel folds (25) are formed in the plate (24), of which the cup (1) is bent, a blank is cut from the plate (24) to form the cup (1), the so cut blank is bent into the shape of a cup (1), so that in the area which will be a part of the
10 bottom of the cup (1) the folds (25) remain in upright position for the attaching of the wick (2) therebetween.

2. A method according to claim 1, characterized in that the blank is bent by the arbor (22) against the mould (20) to
15 form the cup (1), and/or the cup is filled with candle material while being supported in the mould (20) or corresponding.

3. A method according to claims 1 or 2, characterized in
20 that the walls of the folds (25) are pressed from the inside of the cup while the wick (2) is between the folds (25).

4. A method according to one of the claims above, characterized in that the parallel folds (25) are extended substantially to the whole length of the plate (24), and/or in case
25 of a blank, to the whole length of the blank, and/or the attaching spot of the wick provided by the folds (25) is substantially in the center of the bottom.

30 5. A method according to claim 4, characterized in that the folds (25) of the blank are left in upright position only in the center to be of the cup (1) and are flattened elsewhere, and/or that the ridges of the folds rise upwards from the bottom to be of the cup (1).

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6. A method according to any of the claims above, characterized in that the folds (25) of the cup are bent by pushing with the fold shaping means (26) against the plate (24), of

which the cup (1) is formed, and by letting the rest of the plate (24) move freely.

7. A method according to one or several above claims, characterized in that the cup is formed against a mould (20) placed in a periodically rotating drum (21) in the first position of the drum, the wick (2) is fed in one of the predetermined second positions of the drum to the attaching means (25) in the bottom of the cup and the wick (2) is attached, the cup (1), formed in the second position, is filled with candle material (9) in the third position of the drum (21), the container candle made in the third position is moved to the fourth position, in which the container candle is removed from the mould.

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8. A method according to claim 7, characterized in that the drum (21) is rotated at intervals of 90 degrees.

9. A method according to claim 7, characterized in that the wick (2) is pressed either from the outside of the cup (1) by e.g. clips (7, 8) or from the inside of the cup by the wick guide means (5) provided with a groove at its end for receiving the folds (25), by twisting the guide means (5), causing the folds (25) to press the wick (2) to the bottom.

25

10. A method of attaching a wick in a container, in which method attaching means (25) are made in the cup (1), characterized in that, at least two parallel folds (25) are formed in the plate (24), of which the cup (1) is bent, a blank is cut from the plate (24) to form the cup, the so cut blank is bent into the shape of a cup (1), so that in the spot of the bottom to be of the cup (1) the folds (25) remain in upright position for the attaching of the wick (2), the wick (2) is attached between the folds (25).

35

11. A candle cup, having a bottom and walls projecting upward therefrom, and provided in the center with a attaching spot for the wick, characterized in that into the cup (1)

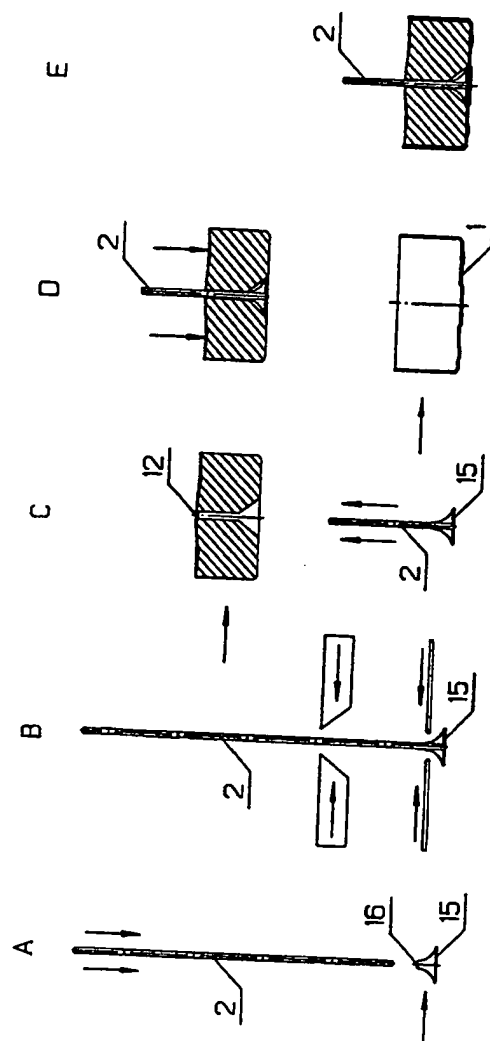
have been formed folds (25) extending substantially over the whole length of the cup blank.

12. A cup according to claim 11, characterized in that the 5 walls of the folds (25) are flattened substantially in the direction of the cup bottom and correspondingly of the cup walls outside the center of the cup (1) bottom, and that the folds (25) are pressed together in the center of the cup so that the wick (2) comes between them.

10

13. A method of manufacturing a candle cup, characterized in that, at least two parallel folds (25) are formed in the plate (24), of which the cup is bent, a blank is cut from the plate (24) for the forming of the cup (1), the so cut 15 blank is bent into the shape of a cup (1), so that at least in the spot of the bottom to be of the cup (1) the folds (25) remain in upright position.

FIG. 1



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FIG. 2

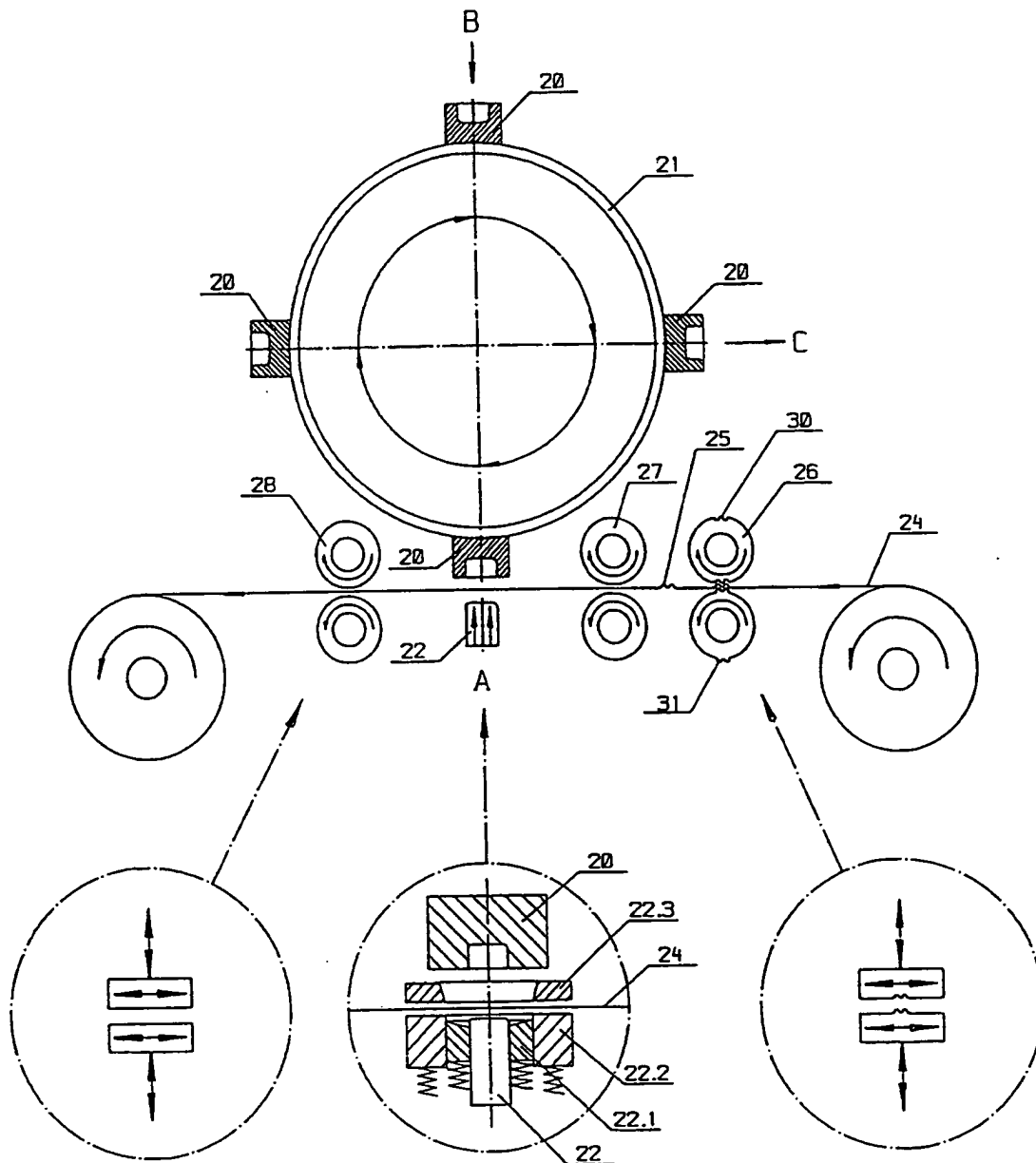


FIG. 3

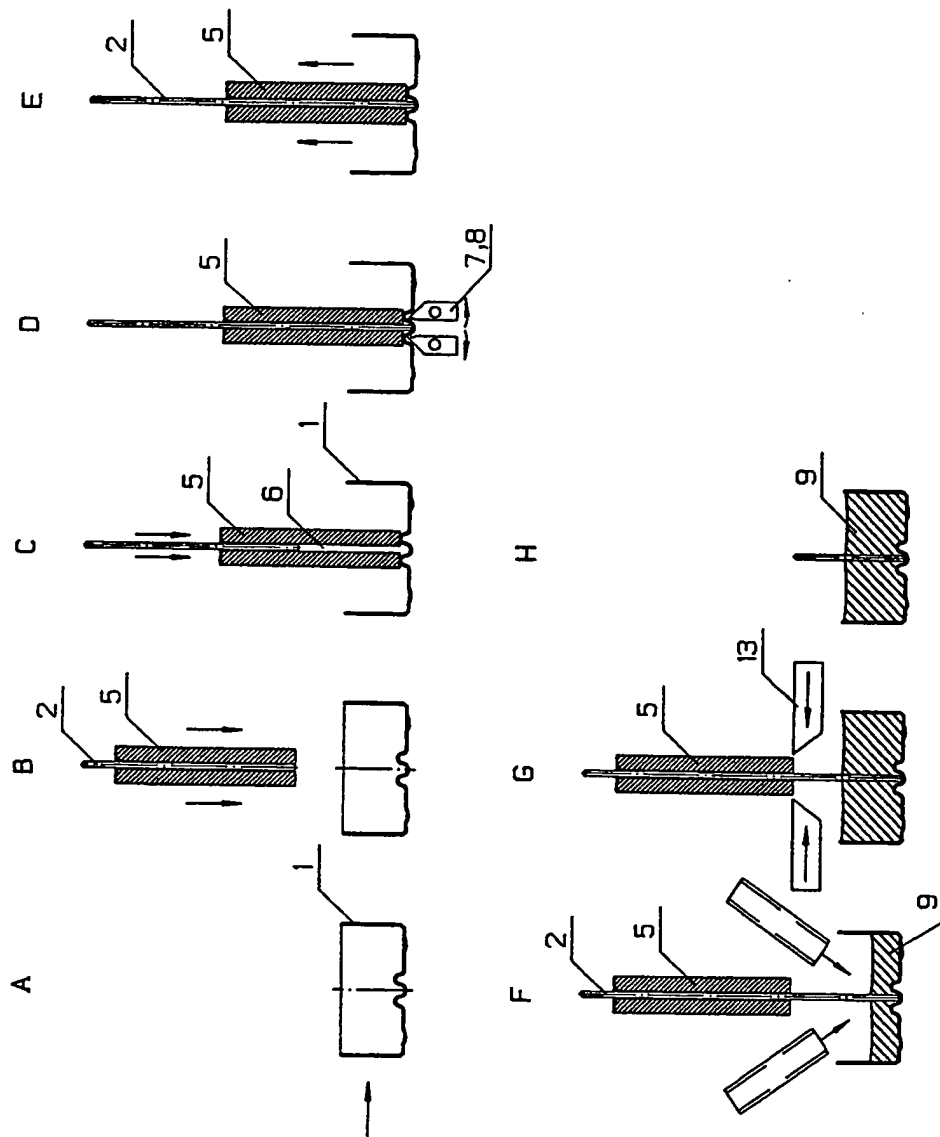


FIG. 4

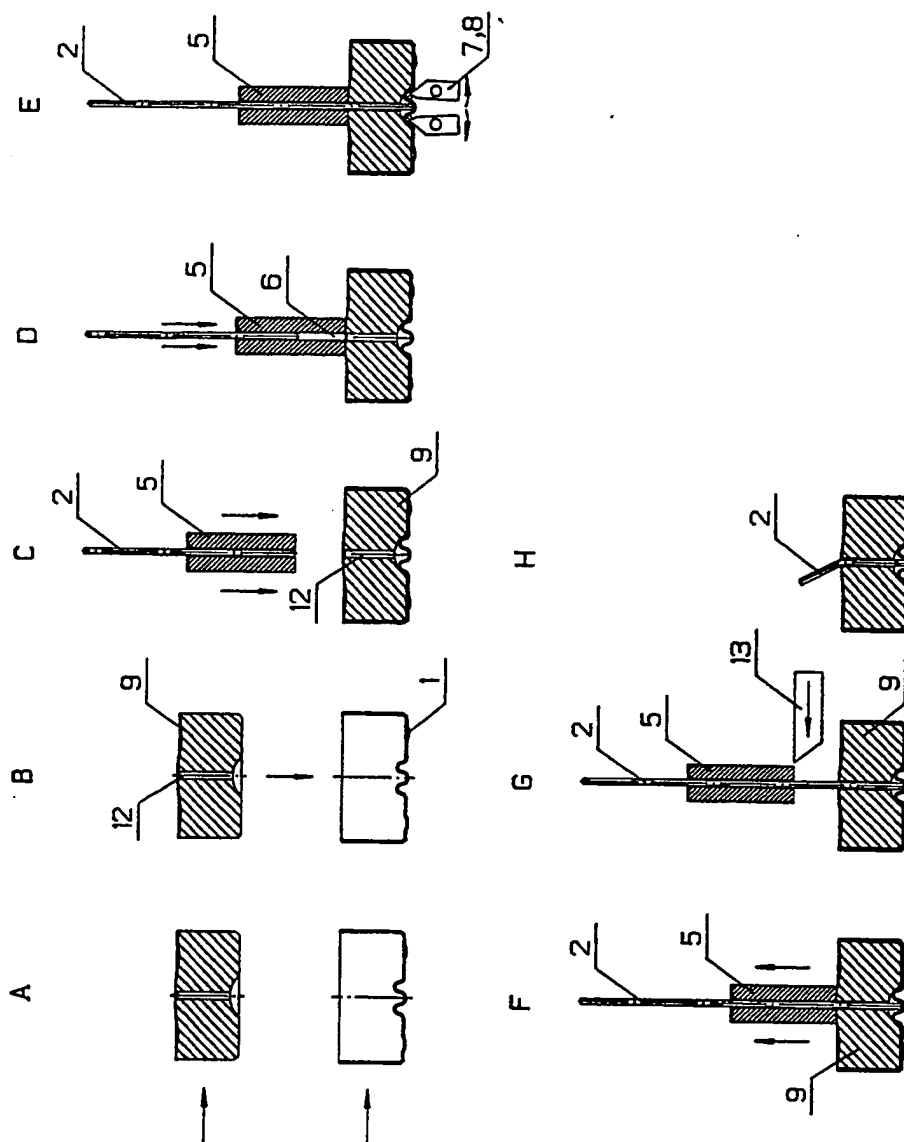
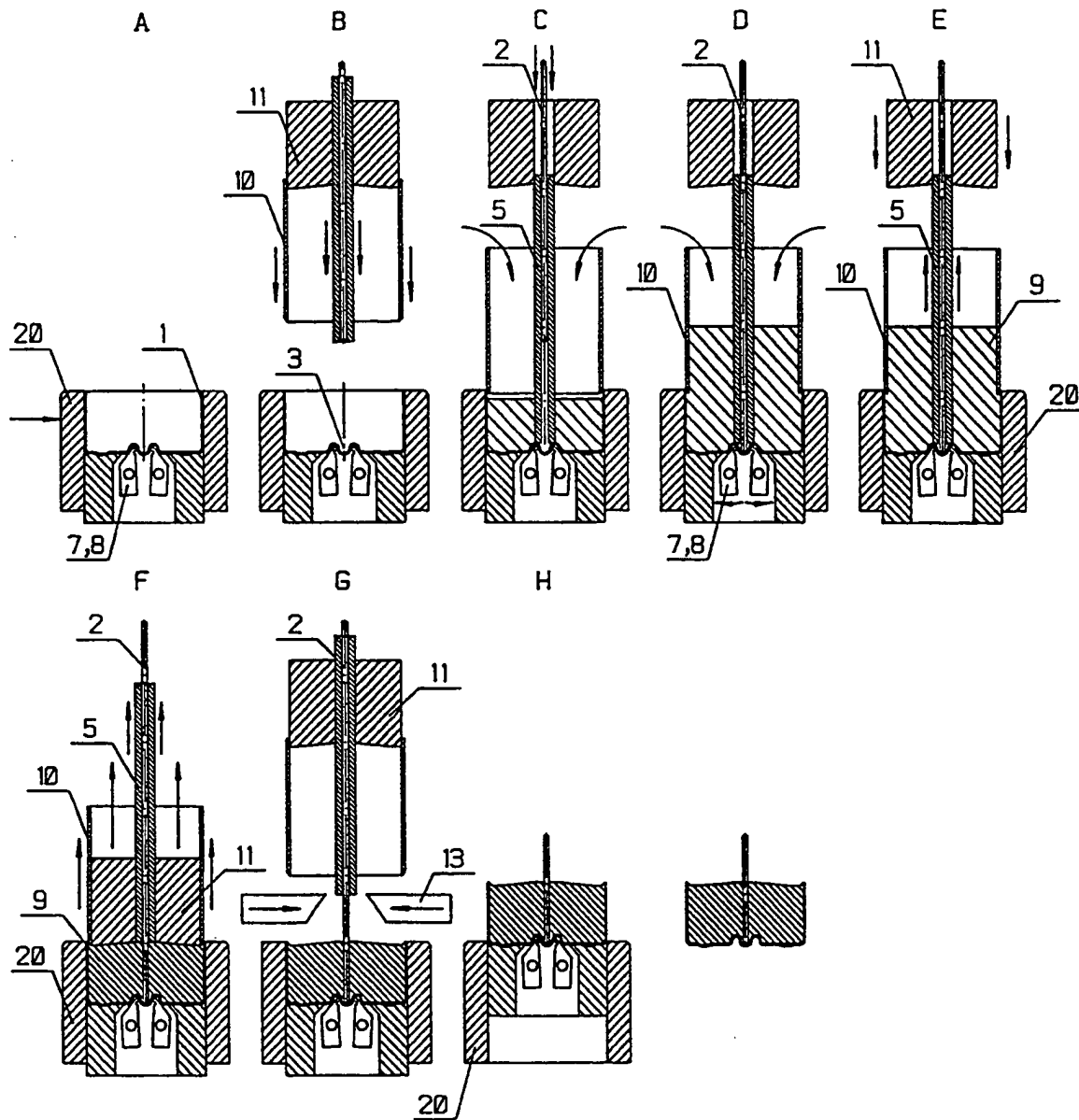
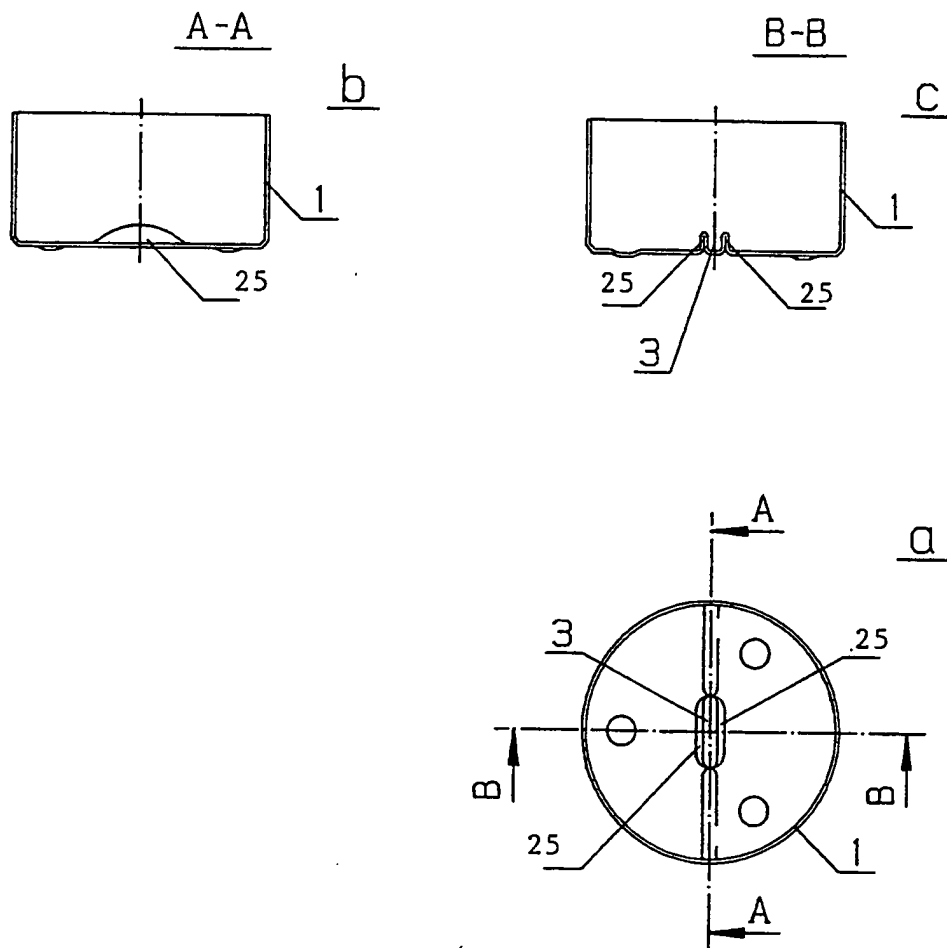


FIG. 5



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FIG. 6



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 94/00566

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: F21S 17/00, C11C 5/00 // F23D 3/24

According to International Patent Classification (IPC) or to both national classification and IPC

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IPC6: C11C, F21S, F21V, F23D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO c classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE, C1, 3918591 (MAURER, ROLF), 13 Sept 1990 (13.09.90), column 3, line 44 - column 4, line 8, figures 1-6 --	1,10,11,13
A	DE, U1, 8616729 (INDERBIETHEN, KARSTEN), 27 November 1986 (27.11.86), figures 1,2, claims 1, 5 -- -----	1,10,11,13

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

09/02/95

International application No.

PCT/FI 94/00566

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-C1- 3918591	13/09/90	NONE	
DE-U1- 8616729	27/11/86	NONE	